CLAIMS

1. A substrate dividing method comprising the steps of:

irradiating a substrate with laser light while positioning a light-converging point within the substrate, so as to form a modified region due to multiphoton absorption within the substrate, and causing the modified region to form a starting point region for cutting along a line along which the substrate should be cut in the substrate inside by a predetermined distance from a laser light incident face of the substrate; and

grinding the substrate after the step of forming the starting point region for cutting such that the substrate attains a predetermined thickness.

2. A substrate dividing method according to claim 1, wherein the substrate is a semiconductor substrate.

3. A substrate dividing method according to claim 2, wherein the modified region is a molten processed region.

4. A substrate dividing method according to claim 1, wherein the substrate is an insulating substrate.

5. A substrate dividing method according to one of claims 1 to 4, wherein a front face of the substrate is formed with a functional device; and

wherein a rear face of the substrate is ground in the step of grinding the substrate.

6. A substrate dividing method according to claim

5, wherein the step of grinding the substrate includes a step of subjecting the rear face of the substrate to chemical etching.

7. A substrate dividing method comprising the steps of:

irradiating a substrate with laser light while positioning a light-converging point within the substrate under a condition with a peak power density of at least 1×10^8 (W/cm^2) at the light-converging point and a pulse width of 1 μs or less, so as to form a modified region including a crack region within the substrate, and causing the modified region to form a starting point region for cutting along a line along which the substrate should be cut in the substrate inside by a predetermined distance from a laser light incident face of the substrate; and

grinding the substrate after the step of forming the starting point region for cutting such that the substrate attains a predetermined thickness.

8. A substrate dividing method comprising the steps of:

irradiating a substrate with laser light while positioning a light-converging point within the substrate under a condition with a peak power density of at least 1×10^8 (W/cm^2) at the light-converging point and a pulse width of 1 μs or less, so as to form a modified region including a molten processed region within the substrate, and causing

the modified region to form a starting point region for cutting along a line along which the substrate should be cut in the substrate inside by a predetermined distance from a laser light incident face of the substrate; and

grinding the substrate after the step of forming the starting point region for cutting such that the substrate attains a predetermined thickness.

9. A substrate dividing method comprising the steps of:

irradiating a substrate with laser light while positioning a light-converging point within the substrate under a condition with a peak power density of at least 1×10^8 (W/cm^2) at the light-converging point and a pulse width of 1 ns or less, so as to form a modified region including a refractive index change region which is a region with a changed refractive index within the substrate, and causing the modified region to form a starting point region for cutting along a line along which the substrate should be cut in the substrate inside by a predetermined distance from a laser light incident face of the substrate; and

grinding the substrate after the step of forming the starting point region for cutting such that the substrate attains a predetermined thickness.

10. A substrate dividing method comprising the steps of:

irradiating a substrate which is made of a semiconductor

material with laser light while positioning a light-converging point within the substrate under a condition with a peak power density of at least 1×10^8 (W/cm^2) at the light-converging point and a pulse width of 1 μs or less, so as to form a modified region within the substrate, and causing the modified region to form a starting point region for cutting along a line along which the substrate should be cut in the substrate inside by a predetermined distance from a laser light incident face of the substrate; and

grinding the substrate after the step of forming the starting point region for cutting such that the substrate attains a predetermined thickness.

11. A substrate dividing method comprising the steps of:

irradiating a substrate which is made of a piezoelectric material with laser light while positioning a light-converging point within the substrate under a condition with a peak power density of at least 1×10^8 (W/cm^2) at the light-converging point and a pulse width of 1 μs or less, so as to form a modified region within the substrate, and causing the modified region to form a starting point region for cutting along a line along which the substrate should be cut in the substrate inside by a predetermined distance from a laser light incident face of the substrate; and

grinding the substrate after the step of forming the starting point region for cutting such that the substrate

attains a predetermined thickness.

12. A substrate dividing method comprising the steps of:

irradiating a substrate which is made of a semiconductor material with laser light while positioning a light-converging point within the substrate, so as to form a molten processed region within the substrate, and causing the molten processed region to form a starting point region for cutting along a line along which the substrate should be cut in the substrate inside by a predetermined distance from a laser light incident face of the substrate; and

grinding the substrate after the step of forming the starting point region for cutting such that the substrate attains a predetermined thickness.